

### REMARKS

The Applicants have received and reviewed the Office Action mailed April 6, 2004, Paper No. 5. The Applicants originally submitted claims 1-18 in this application. By the present Response and Amendment, the Applicants have amended claim 13. Thus, claims 1-18 remain pending in this application. The Applicants have not introduced any new matter.

The applicants have amended claim 13 to correct typographical errors. More specifically, the applicants have amended line 6 by replacing the word "a" with "an" and have amended line 7 by replacing the semicolon at the end of the line with a period.

The Examiner rejected claims 1-18 under 35 U.S.C. §103(a) as being obvious over Shiragaki (US Patent No. 5,457,556). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

The applicants' invention includes a wide-sense non-blocking wavelength division multiplexed (WDM) cross-connect device. The unique and inventive arrangement of components in the applicants' cross-connect device reduces the number of wavelength interchangers required for proper operation of the cross-connect device. Shiragaki, which discloses an optical cross-connect system for switching WDM signals, focuses on reconfiguring network routes to minimize fault recovery procedures. Thus, clearly, the general purpose of the applicants' cross-connect device is completely different from that of the cross-connect devices in Shiragaki.

Moreover, although the applicants' WDM cross-connect device and Shiragaki's cross-connect system include many similar components (as do many cross-connect devices), the specific configuration and resulting operation of the applicants' cross-connect device is so drastically different from those of Shiragaki that the applicants' device clearly is not obvious in view of Shiragaki.

For example, in the Examiner's remarks, the Examiner states that, in Fig. 5 of Shiragaki, a (left) wavelength space switch 13 discloses the applicants' first fabric (11), a

wavelength converters 55 disclose the applicants' wavelength interchangers (13). However, the applicants respectfully note that neither wavelength space switch in Shiragaki corresponds to any one of the fabrics in the applicants' invention. Each wavelength space switch in Shiragaki is an  $n \times n$  optical switch that takes  $n$  input signals decomposed by wavelength (via the demultiplexers 12) and switches the signals of wavelength  $\lambda_i$  to the input of any multiplexer 14 bearing the same wavelength  $\lambda_i$ . See, Shiragaki, e.g., col. 5, lines 26-49 and col. 6, lines 63-66. In the applicants' invention, each of the fabrics is an  $n \times n$  optical cross-connect that does not have the ability to switch signals decomposed by wavelength. See the applicants' specification, e.g., at page 10, lines 1-2.

Secondly, in Shiragaki, there is no disclosure or suggestion of at least one wavelength interchanger coupled or interconnected between the first and second fabrics, as recited in the applicants' claims 1-18. The Examiner states that, in Shiragaki, at least one wavelength interchanger (55) is coupled to an output side of the first fabric (13 - left) and an input side of the second fabric (13 - right). However, the applicants respectfully note that, in Shiragaki, wavelength converters 55 are connected only to the output side of wavelength space switches 13. See, e.g., the direction of the arrows in Fig. 5, most notably the arrows at the output side of the right wavelength space switch 13. Thus, there is a first set of wavelength converters 55 associated with and connected to the output of the first wavelength space switch (13 - left) and a second set of wavelength converters 55 associated with and connected to the output of the second wavelength space switch (13 - right). There are no wavelength converters 55 coupled between the first wavelength space switch (13 - left) and the second wavelength space switch (13 - right).

Also, in Shiragaki, there is nothing that corresponds to the applicants' third fabric (19), as recited in the applicants' claims 1-18. The Examiner states that a space switch 10 corresponds to the applicants' third fabric. However, the applicants note that, in Shiragaki, one space switch 10 corresponds to each wavelength space switch 13 and each space switch 10 is connected to its corresponding wavelength space switch 13 in some sort of

partial feedback arrangement. That is, a portion of the output side of each space switch 10 is connected to a portion of the input side of its corresponding wavelength space switch 13, and a portion of the output side of the wavelength space switch 13 is connected to a portion of the input side of its corresponding space switch 10.

By comparison, in the applicants' invention, the third fabric 19 (which the applicants submit is not suggested by either one or both of the space switches 10 in Shiragaki) is connected between the first and second fabrics in such a way that the input side of the third fabric 19 connects to the input side of the first fabric 11 and the output side of the third fabric 19 connects to output side of the second fabric 12. See, e.g., the applicants' Fig. 3. As discussed in the applicants' specification, the third fabric 19 is connected between the first and second fabrics to allow any demand whose input and output wavelength are the same to be routed from the input side of the first fabric 11 to the output side of the second fabric 12 without being routed through any wavelength interchangers connected between the first and second fabrics. See the applicants' specification, e.g., at page 10, lines 8-12. Nothing in Shiragaki suggest either the configuration or functionality of the applicants' third fabric 19.


Clearly, the component sets of Shiragaki do not correspond to the components of the applicants' invention as recited in claims 1-18. Furthermore, the arrangement of components in Shiragaki is vastly different from that of the applicants' invention. Thus, the operation of the cross-connect device in Shiragaki, which focuses on having available backup optical links to reduce fault recovery procedure, cannot possibly be similar to or even suggestive of the operation of the applicants' cross-connect device as recited in claims 1-18.

Accordingly, the applicants respectfully submit that Shiragaki neither teaches nor suggests the applicants' invention as recited in the claims 1-18. Therefore, the applicants respectfully request that the Examiner withdraw the rejection of claims 1-18 under 35 U.S.C. §103(a) as being obvious over Shiragaki.

**CONCLUSION**

In view of the amendments submitted herein and the above comments, the Applicants respectfully submit that all grounds of rejection are overcome and that the application has now been placed in full condition for allowance. Accordingly, the Applicants earnestly solicit early and favorable action. Should there be any further questions or reservations, the Examiner is urged to telephone the Applicants' undersigned attorney at (770) 984-2300.

Respectfully submitted,

  
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John M. Harman  
Reg. No. 38,173

GARDNER GROFF, P.C.  
Paper Mill Village, Building 23  
600 Village Trace, Suite 300  
Marietta, GA 30067  
Tel: 770/984-2300  
Fax: 770/984-0098